APPENDIX A

UML Model Report and Class Descriptions

Overview

The following is a UML model report generated by Rational Rose, as well as descriptions of various UML classes according to one embodiment of the invention.

Content

SubComponents

None

Classes

ApplicationControlMacro

TransactionControlMacro

TResidency

TLanguage

TScheduleType

TProgramType

Boolean

TMode

MessageType

String

TSysID

TFPBuffer

TClass

TPriority

TScheduleOption

TParallelLimit

TMaxRegions

ProcessLimitType

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

UnsignedInteger

TSpaSize

TSegment

TResponse

Classes

ApplicationControlMacro Class

Introduction

TheApplicationControlMacro defines the program resource requirements for application programs that run under the control of the IMS DB/DC environment, as well as for applications that access databases through DBCTL. When combined with one or more TransactionControlMacros, the ApplicationControlMacro defines the scheduling and resource requirements for an application program. On the ApplicationControlMacro, one only describes programs that operate in message processing regions, Fast Path message-driven program regions, batch message processing regions, or CCTL threads. The ApplicationControlMacro is also used to describe application programs that operate in batch processing regions.

Base Classes

None

Attributes

ResidencyOption: TResidency

The positional parameter Resident specifies that the PSB associated with the application program is to be made resident during system initialization. Resident and DynamicOption (dynamic PSB option) are mutually exclusive. DynamicOption and ScheduleType=Parallel are also mutually exclusive.

Neither Resident nor DynamicOption is the default parameter. Rather, if neither Resident nor DynamicOption is selected on the ApplicationControlMacro statement, IMS system initialization causes a BLDL to be performed on the PSB associated with the application being defined. The PSB is not made resident (that is, loaded from the ACBLIB) until the application is scheduled.

isFPath: Boolean = False

Specifies whether the application is a Fast Path exclusive application program. If True, the ProgramType parameter is invalid and TransactionControlMacro.isWaitForInput=True is forced.

FPathBuff rSize: TFPBuffer

Determines the EMH buffer size required to run the transaction and overrides the EML execution parameter.

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

GeneratedPSBName: String

Defining this attribute causes the scheduling process of all environments to generate a PSB containing an I/O PCB and an alternate modifiable PCB. With this attribute coded, one does not need to perform the PSBGEN and the ACBGEN, thus eliminating I/O to the ACBLIB.

GeneratedPSBName generates an I/O PCB named IOPCBbbb; The modifiable, alternate PCB is named TPPCB1bb. With an alternate modifiable PCB, an application can use the CHNG call to change the output destination and send output to a destination other than the input destination.

The GeneratedPSBName and the PSBName attributes are mutually exclusive.

GeneratedPSBLanguage: TLanguage = Assembler

Defines the language interface of the application program.

This attribute may only be valid if the GeneratedPSBName is specified.

ProgramType: TProgramType = TeleProcessing

Describes the type of application program being defined. The default, TeleProcessing, specifies that IMS schedules the program when messages processed by the program exist in the system. A program defined as Batch can use DL/I in the IMS control program system region and can refer to the message queues. If Batch is coded, all TransactionControlMacros statements that follow are assigned normal and limit priority values of zero.

ProgramClass: TClass = 1

This attribute specifies the class to which the transaction codes specified in the TransactionControlMacro statements are to be assigned.

The value should not exceed the value given (by specification or default) on the MAXCLAS keyword of the IMSCTRL macro.

If the transaction code class is defined in the individual TransactionControlMacro statement, this parameter is ignored.

The numeric class parameter should not be specified if ApplicationControlMacro.isFPath=True is specified.

PSBName: String

Specifies the name of the PSB associated with this application program definition. Each local PSB name must be unique. A remote and a local application can each be defined as having the same PSB name. This may be required in order to dynamically reassign a transaction from remote to local processing.

The GeneratedPSBName and the PSBName attributes are mutually exclusive. The PSBName is required, if no GeneratedPSBName is specified.

ScheduleType: TScheduleType = Serial

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

Specifies the application program can be scheduled into more than one message region or batch message region simultaneously..

ScheduleType and ResidencyOption=DynamicOption are mutually exclusive.

SysIDRemote: TSysID

Specifies in the multiple IMS system configuration, the system identification (SysID) of the remote system (that system on which the application executes).

If the ApplicationControlMacro.SysID parameters are defined, all other parameters of the ApplicationControlMacro except the PSB are ignored. If the TransactionControlMacro.SysID parameters are defined, the ApplicationControlMacro.SysID parameters are ignored. This parameter is invalid, if ApplicationControlMacro.isFPath=True is coded.

If this attribute is specified the SysIDLocal attribute must be specified, too.

SysIDLocal: TSysID

Specifies in the multiple IMS system configuration, the system identification (SysID) of the local system (the originating system to which the response are returned).

If the ApplicationControlMacro.SysID parameters are defined, all other parameters of the ApplicationControlMacro except the ApplicationControlMacro.PSB are ignored. If the TransactionControlMacro.SysID parameters are defined, the ApplicationControlMacro.SysID parameters asr ignored. This attribute is invalid, if ApplicationControlMacro.isFPath=True is coded.

If this attribute is specified the SysID_Remote attribute must be specified, too.

Inherited Attributes

Associations

TRANSACT with TransactionControlMacro

TransactionControlMacro Class

Introduction

The TRANSACT macro statement is used one or more times with each ApplicationControlMacro statement to identify a transaction as IMS exclusive, IMS Fast Path potential or IMS Fast Path exclusive. It specifies the transaction codes that cause the application program named in the preceding ApplicationControlMacro to be scheduled for execution in an IMS message processing region. It also provides the IMS control program with information that influences the application program scheduling algorithm. It can define a message editing routine.

Base Classes

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

None

Attributes

TransactionCode: String

Specifies the transaction code associated with this TransactionControlMacro statement.

isDCLogWriteAhead: Boolean

Specifies whether IMS should perform log write-ahead for recoverable, nonresponse mode input messages and transactions output messages. If not specified in the TransactionControlMacro, the default is the DCLogWriteAhead parameter in the IMSCTRL macro. The DCLogWriteAhead parameter in the TransactionControlMacro overrides the IMSCTRL macro parameter for this transaction.

toUpperCase: Boolean = True

Specifies whether (True) or not (False) the input data is to be translated to uppercase before beeing presented to the processing program.

Specifying True for VTAM terminals prevents the transmission of embedded device control characters.

Specifying the attribute requires specifying the EditRoutine attribute.

EditRoutine: String

This attribute allows a user to a transaction input edit routine that edits messages prior to the program receiving the message. The specified edit routine (load module) must reside on the USERLIB data set prior to IMS system definition stage 2 execution. This routine cannot be the same as the one that is used on a LINEGRP or TYPE EDIT parameter.

This attribute is invalid on a Fast Path exclusive transaction.

isFPath: Boolean = False

Specifies whether the transaction code is a potential candidate for Fast Path processing. Specifying True is effective only when specified on a TransactionControlMacro that follows an ApplicationControlMacro statement that does not specify isFPath=True; otherwise, the operand is ignored.

Fast Path potential transactions must be processed by a user edit/routing exit to determine whether the transaction is actually to be processed by IMS Fast Path. If it is to be processed by IMS Fast Path, the edit/routing exit associates the transaction with a routing code. This routing code identifies which Fast Path application program is to process the transaction.

FPathBufferSize: TFPBuffer

Determines the EMH buffer size required to run the transaction and overrides the EML execution parameter.

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

isInquiry: Boolean = False

Specifies whether the transaction is an inquiry transaction.

isRecover: Boolean = True

Specifies whether the transaction should be recoverd during an IMS emergency or normal restart. If isInquiry=False is coded, isRecover=False cannot be coded.

For IMS Fast Path transactions, isRecover must be True.

If the SPA parameter is specified, the combination of isInquiry=True and isRecover=False must not be coded.

MaxRegions: TMaxRegions = 0

Limits the number of message processing program (MPP) regions that can be concurrently scheduled to process a transaction. When the number of MPP regions is not limited, one transaction can be monopolize all available regions.

If the value is zero, no limit is imposed.

If ApplicationControlMacro.ScheduleType=Serial or TransactionControlMacro.isSerial=True is specified, the MaxRegions parameter must be omitted or zero.

Mode: TMode = MultipleMessage

Specifies that database buffers are to be written to direct access (flushed) upon each request for a new message (SingleMessage) by the processing program, or upon program termination (MultipleMessage). Conversational and WaitForInput transactions must be defined as SingleMessage. SingleMessage is forced for WaitForInput applications.

This operand is not appropriate if a transaction destined for processing in another (remote) system is being specified.

MessageType: TSegment = MultipleSegment

Specifies the type of transaction code (single or multiple segment).

The transaction code can be single segment (SingleSegment), or multiple segment (MultipleSegment). It specifies the time at which an incoming message is considered complete and available to be routed to an application program for subsequent processing.

The meaning of the values in detail:

MultipleSegment: Specifies that the incoming message is one segment in length. It is not eligible for scheduling to an application program until an end-of-message indication is received, or a complete message is created by MFS.

SingleSegment: Specifies that the incoming message is one segment in length. It becomes eligible for scheduling when the terminal operator indicates end-of-segment.

MessageIsResponse: TResponse = NonResponse

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

Specifies whether or not the communication line from the transaction was entered is to be held until a response is received.

The meaning of the values in detail:

NonResponse: Specifies that, for terminals specifying or defaulting to OPTIONS=TRANRESP, input should not stop after this transaction is entered.

Response: Specifies that, for terminals specifying or defaulting to OPTIONS=TRANRESP, no further messages are to be allowed after this transaction is entered until this transaction sends a response message back to the terminal. Response mode can be forced or negated by individual terminal definition.

MessageClass: TCLass = 1

Specifies the class to which this transaction code is to be assigned.

ParallelLimit: TParallelLimit

Specifies the threshold value to be used when ApplicationControlMacro.ScheduleType=Parallel was specified in the preceding ApplicationControlMacro instruction. An additional region is scheduled whenever the current transaction enqueue count exceeds the ParallelLimit value multiplied by the number of regions currently scheduled for this transaction. If ParallelLimit is not specified, the default value of none is assumed, and IMS allows the transaction to be scheduled in only one region at a time.

ParallelLimit=0 indicates that any input message can cause a new region to be scheduled because the scheduling condition will always be met.

If ParallelLimit=0 is specified, the MaxRegions value should be specified to limit the number of regions that can be scheduled to process a particular transaction.

This operand is not appropriate if a transaction destined for processing in another (remote) system is being specified.

ProcessLimitCount: UnsignedInteger = 65535

Specifies the number of messages (count) of this transaction code a program can process in a single scheduling.

This field specifies the number of messages sent to the application program by the IMS control program for processing without reloading the application program. If 0 is coded, the maximum number of messages sent to the application is one and the application program is reloaded before receiving a subsequent message. The value 65535 means no limit is being set.

This operand is not appropriate if a transaction destined for processing in another (remote) system is being specified.

ProcessLimitSeconds: UnsignedInteger = 65535

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

Specifies the amount of time (in seconds) allowable of this transaction code to process a single transaction (or message).

If Fast Path is used, the keyword parameter specifies, for a given transaction code, the amount of time (in hundredths of seconds) the program is allowed to process a single transaction message. The time represents real time elapses during transaction processing (not accumulated task time). Real time is used because the input terminal is in response mode and cannot enter another transaction until the response is sent. In this case, the ProcessLimitCount is ignored.

The value 0 is invalid.

This operand is not appropriate if a transaction destined for processing in another (remote) system is being specified.

PriorityNormal: TPriority = 1

Specifies the priority of this transaction when the number of input transactions enqueued and waiting to be processed is less than the PriorityLimitCount value.

PriorityLimit: TPriority = 1

Specifies the priority of this transaction to which it is raised when the number of input transactions, enqueued and waiting to be processed is equal to or greater then the PriorityLimitCount value.

PriorityLimitCount: UnsignedInteger = 65535

Specifies the number that, when compared to the number of input transactions enqueued and waiting to be processed, determines whether the normal or limit priority value is assigned to this transaction.

The value 0 is invalid.

isRouting: Boolean = False

If MSC directed routing is used in a multiple IMS system configuration, specifies whether the application program processing a transaction is informed of the system which originated the transaction.

ScheduleOption: TScheduleOption = 1

Specifies the scheduling option used for other transactions when this transaction cannot be scheduled for internal reasons (database intent or no more space in PSB pool or DMB pool to bring in needed blocks).

The meaning of the values in detail:

1: Schedule only transactions of equal or higher priority in the selected class.

2: Schedule higher priority transactions in the selected class.

3: Schedule any transaction in the selected class.

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

4: Skip to the next class and attempt to schedule the highest priority transaction in that class.

This operand is not appropriate if a transaction destined for processing in another (remote) system is being specified.

SegmentNumber: UnsignedInteger = 0

Specifies the maximum number of application program output segments that will be allowed into the message queues per Get Unique (GU) call from the application program.

This operand is not appropriate if a transaction destined for processing in another (remote) system is being specified.

SegmentSize: UnsignedInteger = 0

Specifies the maximum number of bytes allowed in any one output segment.

This operand is not appropriate if a transaction destined for processing in another (remote) system is being specified.

isSerial: Boolean = False

Specifies whether the processing of messages for a given transaction is forced to be serial.

If True is specified, ParallelLimit and MaxRegions must equal zero (they can be omitted). If they are not, False is assumed.

This operand is not appropriate if a transaction destined for processing in another (remote) system is being specified.

SPASize: TSpaSize

Defines by inclusion that this transaction is a conversational transaction.

The value specifies the size of the conversational scratchpad area (SPA).

SPAIsTruncated: Boolean = True

Specifies whether the truncated data option is used with the scratchpad area. .

SysIDRemote: TSysID

Specifies in the multiple IMS system configuration, the system identification (SysID) of the remote system (that system on which the application executes).

If the ApplicationControlMacro.SysID parameters are specified, the TransactionControlMacro.SysID parameters don't need to be specified. If both SysID parameters are specified, the ApplicationControlMacro.SysID parameters are ignored.

SysIDLocal: TSysID

Specifies in the multiple IMS system configuration, the system identification (SysID) of the local system (the originating system to which the response are returned).

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

If the ApplicationControlMacro.SysID parameters are specified, the TransactionControlMacro.SysID parameters don't need to be specified. If both SysID parameters are specified, the ApplicationControlMacro.SysID parameters are ignored.

isWaitForInput: Boolean

Specifies whether (True) or not (False) this is a wait-for-input transaction. A message processing or batch processing application program that processes WaitForInput transactions is scheduled and invoked normally. If the transaction to be processed is defined as WaitForInput, the program is allowed to remain in main storage after it has processed the available input messages. The QC status code (no more messages) is returned to the program if the ProcessLimitCount value is reached.

Mode=SingleMessage will be forced, if isWaitForInput=True is coded.

This operand is not appropriate if a transaction destined for processing in another (remote) system is being specified.

Inherited Attributes

Associations

APPLCTN with ApplicationControlMacro

TResidency enumeration

Attributes

Resident
DynamicOption

TLanguage enumeration

Attributes

Assembler
COBOL
PL/1
PL/I
Pascal

TScheduleType enumeration

Attributes

Serial
Parallel

TProgramType enumeration

Attributes

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

TeleProcessing
Batch

Boolean enumeration

Attributes

False
True

TMode enumeration

Attributes

MultipleMessage
SingleMessage

MessageType enumeration

Attributes

MULTSEG,NONRESPONSE
SNGLSEG,RESPONSE

String primitive

length: 1..8
valid characters: A through Z, #, $, @, 0 through 9

TSysID primitive

Valid values: 1..2036

TFPBuffer primitive

Valid values: 12..30720

TClass primitive

valid values: 1..255

TPriority primitive

valid values: 0..14

TScheduleOption primitive

valid values: 1..4

TParallelLimit primitive

valid values: 0..32767

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101

TMaxRegions primitive

valid values: 0..255

ProcessLimitType primitive

valid values: 1..65535

UnsignedInteger primitive

valid values: 0..65535

TSpaSize primitive

valid values: 16..32767

TSegment enumeration

Attributes

MultipleSegment
SingleSegment

TResponse enumeration

Attributes

Response
NonResponse

MADSON & METCALF, P.C.
ATTORNEYS AT LAW
900 GATEWAY TOWER WEST
15 WEST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84101